NHWWA

NH WATER WORKS ASSOCIATION

Journal

Volume 2, Fall 2023

In October of 2023, the City of Rochester celebrated the completion of a major water infrastructure improvement project. *From Left to right: Superintendent - Water System Ian Rohrbacher, Director of City Services Peter Nourse, Representative William W. Boyd III, Councilor Alex de Geofroy, Rick Skarinka, NH DES, City Manager Katie Ambrose .*

Working for New Hampshire's drinking water experts

NHWWA
NH WATER WORKS ASSOCIATION

JOURNAL

Volume 2, Fall 2023

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Go to NHWWA.org/About Us for the electronic version of the Journal with active links.

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Route 202A Water Main and Storage Tank

Zone Expansion to Serve Those in need in Rochester, NH

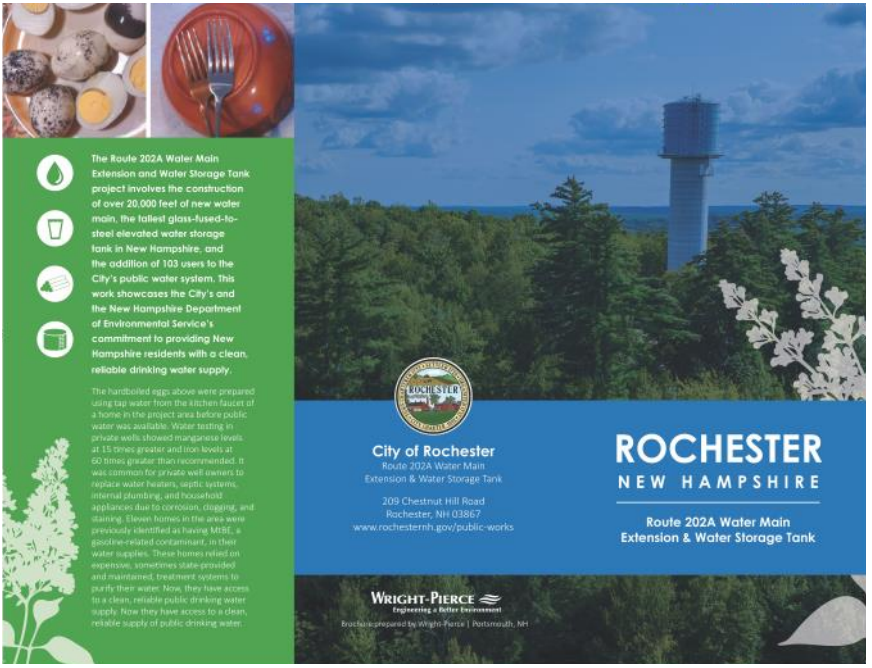
Ian Rohrbacher
Water Superintendent – City of Rochester

Collin Stuart, PE
Lead Project Engineer – Wright-Pierce

The City of Rochester, New Hampshire, is located in southeastern New Hampshire and is the largest city in the seacoast region and the fourth largest city in the state. New Hampshire Route 202A is an east-west highway that runs through the east side of the City of Rochester's (the City) downtown area.

Historically, residents along State Route 202A and adjacent streets have experienced poor water quality due to iron, manganese, and methyl tert-butyl ether (MtBE) contamination. Private wells testing indicated high concentrations of contaminants, including manganese at levels 15 times greater than recommended and iron at levels 60 times greater than recommended. In response, the City retained engineering firm Wright-Pierce to develop a multi-point plan to address clean, reliable drinking water under the Route 202A Water Main Extension and Storage Tank project. Part of the project area had previously identified MtBE, a gasoline-related contaminant, in private water supplies. At the time of design, these homes relied on expensive, state-maintained or privately maintained point-of-use water treatment systems. In addition to water quality issues, private well supply in the project area was significantly limited during statewide seasonal drought conditions.

The Route 202A Water Main Extension and Storage Tank project involved the installation of over 20,000 linear feet of water main and the erection of the tallest glass-fused-to-steel-composite elevated water storage tank in New Hampshire in support of improving water



quality and supply in the community. The project is ongoing but, as of December 1st, 2023, all water mains and services are installed and online, connecting approximately 106 residences to City water. Construction is anticipated to be completed in the Spring of 2024.

Project Funding

The City, with assistance from grant funding and low-interest loans, invested $13.5 million over the course of six years to extend clean drinking water service to City residents along New Hampshire Route 202A as part of this project.

The City prioritized sourcing funding for the projects so the financial burden would not fall solely to the community. With Wright-Pierce's assistance, they were able to secure $5.4 million in grants and $1.3 million in low-interest loans from the New Hampshire Drinking Water Groundwater Trust Fund (DWGTF); $3.3 million in grants from the New Hampshire Department of Environmental Services (NHDES) MtBE

Settlement Fund; and $3.5 million in City contributions. As a result, over 64% of the project was paid for using grants.

Water Main and Services

This project included the installation of over 20,000 feet of new 12- and 8-inch-diameter ductile iron water mains to supply City drinking water to residents in the project area. The new water mains were installed along New Hampshire Route 202A, Winkley Farm Drive, Bickford Road, Fiddlehead Lane, cross-country, and off an access drive extending from a private development. The project required considerable coordination between all funding agencies, the NHDES Wetlands Bureau, the New Hampshire Department of Transportation (NHDOT), private landowners, and the surrounding community. The project traversed along several sensitive areas and required crossing through or within proximity of numerous wetlands and five vernal pools. The construction around vernal pools, in combination with seasonal restrictions due to the northern long-eared bat, made for challenging construction sequencing.

Approximately 10,000 linear feet of water main was installed within the NHDOT right-of-way along Route 202A. The right-of-way along the route was surveyed and found to be irregular, with some areas extending over 70 feet from the edge of the pavement and others extending within less than 5 feet of the pavement. The location of the water main and the extent of paving were coordinated closely with NHDOT to obtain an excavation permit. Steep cross-country sections required the use of restrained joint pipe as well as bedding relief drains.

Homeowners had the option to choose to have their services installed and their internal plumbing modifications completed as part of this project. Wright-Pierce and the City closely coordinated with residents to determine residents' interests, the best location for their service, estimated installation costs, and access to private property for

installation and internal plumbing connection. Approximately 106 residences were connected to City water as part of the project. This included the 60 units comprising the Dustin Homestead Condominiums complex. The complex was able to connect to City water and discontinue the use and maintenance of its existing wells and private water treatment system. Homes identified by the MtBE settlement fund as contaminated were eligible to have their service installation paid for as part of the project.

Storage Tank

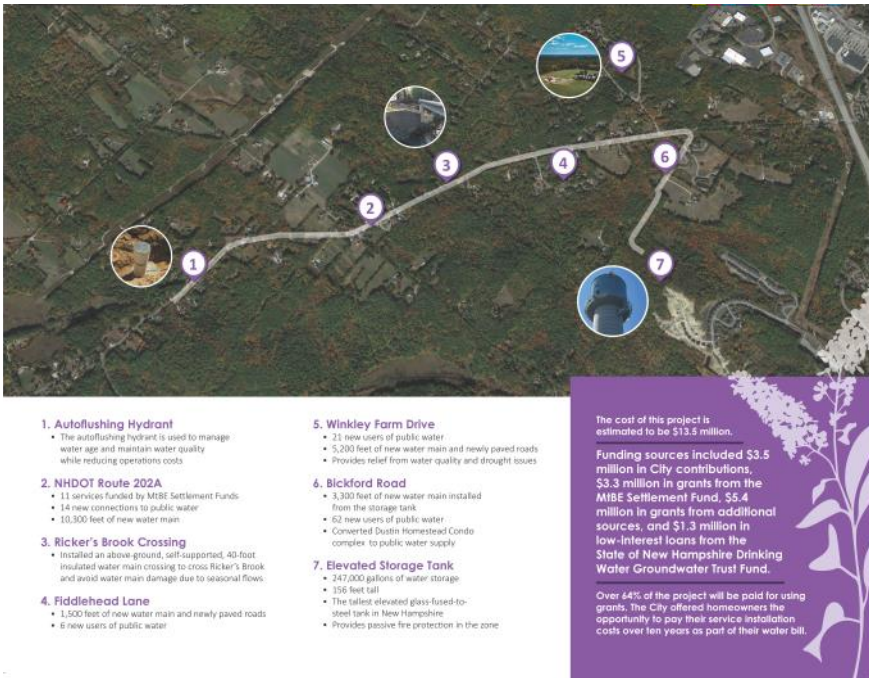
Wright-Pierce performed preliminary hydraulic evaluations and determined that, after construction, the existing booster pump station supplying this pressure zone would not be able to provide enough pressure, fire flow, or the desired resiliency to the entire area. The City considered several options but ultimately selected the construction of a water storage tank to resolve the issue. Wright-Pierce performed hydraulic modeling and used available GIS data to assist the City in determining a location and design for the new water storage tank. To identify the exact height of the storage tank, multiple scenarios were modeled to determine what areas could be supplied to meet hydraulic requirements at the lowest cost per vertical foot of tank constructed.

The City prioritized a tank design with reasonable capital costs and low maintenance costs. To meet the needs of the area and to support future expansion, the City selected a 250,000-gallon glass-fused-to-steel water storage tank. This elevated, composite tank is bolted and measures 36 feet in diameter and 160 feet in height. This design was chosen, in part, based on its low anticipated construction and maintenance costs. The new water storage tank will communicate with the existing Washington Street booster pump station to fill the tank as needed. Improvements to the booster pump station included modern human-machine interfaces (HMIs) and upgraded motor controls and variable frequency drives. Due to limitations in available power to the site, the instrumentation and communication systems at the tank will

be powered by a tank-mounted solar system. The tank utilizes a powered-in-tank mixing system with a separate dedicated solar power supply system.

Elevated Pipe Bridge

NHDOT maintained a bridge crossing Ricker's Brook along Route 202A. It was determined the subsurface soils in the area around the bridge were mostly ledge, preventing directional drilling underneath the bridge wing walls. Due to the age of the bridge and variations in seasonal water flows, NHDOT did not approve attaching a new main to the existing bridge. As a result, the design included installation of a new 40-foot-long pipe utility bridge spanning Ricker's Brook to support installation of a spiral-wound, galvanized metal wrapped, pre-insulated, ductile iron water main with heat trace capabilities. The bridge is self-supporting, adjacent to the existing NHDOT bridge, and will allow for NHDOT to maintain the existing roadway bridge without impacting the water main.



Auto-Flushing Hydrant

It was not feasible to loop the main extending to the end of Route 202A back into the distribution system. The main will dead end, resulting in potential for increased water age and disinfection byproduct (DBP) formation in this location. Distribution system flushing helps exercise hydrants in the system; remove aged water, sediment, and debris; boost disinfectant residual; and reduce DBP levels. To maintain water quality in the main, an automated flushing system was installed to perform unmanned flushing on a regular basis.

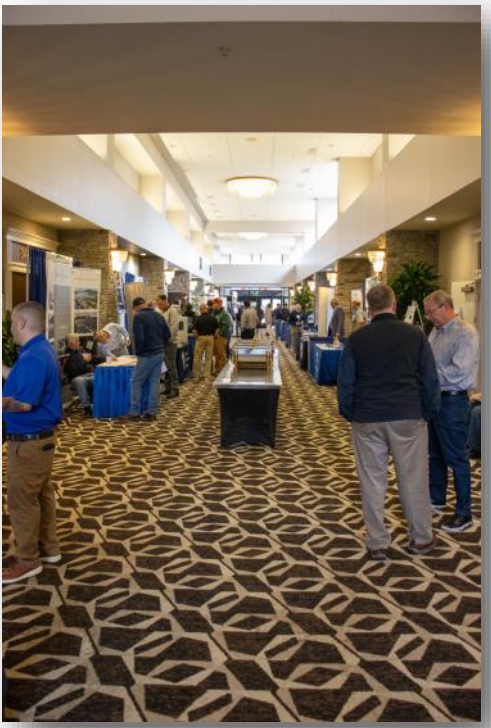
The City and Wright-Pierce compared various automatic flushing systems for use at this dead-end location. The City selected Mueller's HG-8 Cold Climate. This model features a below-grade design with only a cast iron vault lid visible at grade. In addition to the unit's wet parts being below frost depth, a 2-inch foam insulation pad reduces the risk of damage from freezing temperatures in the cold climate typical of the area. This battery-powered system features a Bluetooth controller, double check backflow prevention, in-unit dechlorination system, and a platform easily raised and lowered for maintenance purposes. This system was designed to discharge to a nearby ditch in a wooded area that ultimately drains to a stream.

About Rochester's Public Works Department

The City of Rochester's Public Works Department (the Department) is comprised of approximately 75 individuals dedicated to enhancing the quality of life for Rochester residents and businesses by providing a range of vital services. The Department ensures access to clean drinking water, manages the treatment and disposal of wastewater, maintains a safe and efficient transportation system, and maintains and improves public buildings and grounds. Additionally, the Department provides support to all City departments.

2023 NH Drinking Water Expo and Trade Show

Thank you to all the exhibitors, presenters, volunteers, sponsors and attendees who made the 2023 Expo a great success!



A special thank you to the NH Department of Environmental Services for their support of the 2023 Expo!

Mark your calendars for October 24 for our 2024 Expo!

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Construction Day 2023

The first stop on our 2023 Construction Day tour took us to Manchester Water Works' 7.2 MGD Merrimack River water treatment plant in Hooksett. Dave Miller, Deputy Director Water Supply, Manchester Water Works gave us a tour of the new facility. The new plant receives Merrimack River water from a radial collector well completed in 2016. Riverbank filtration provides natural pretreatment/ clarification of the source water that is pumped to the plant through a 20-inch main where it is processed through greensand filters and GAC contactors, followed by primary disinfection with UV (*Giardia* & *Cryptosporidium* inactivation) and free chlorine. Prior to point of entry, ammonia is added to form monochloramine for residual disinfection.

For stop number 2, we traveled down Rt. 3 to see Merrimack Village District's well 2 & 9 PFAS treatment facility. It went online March 21, 2023 and can treat up to 2.8 MGD. Well 9 replaced Well 3, which had been impacted by de-icing salt contamination. Peter Pitsas and Lynnette Carney of Underwood Engineers provided an excellent presentation on the project.

Our final stop was back in Concord where we visited the City's new 10 MGD high lift pump station. Concord recently replaced its antiquated high lift pumping station with a new, energy efficient system. The original station had been in continuous operation since the mid 1940's, serving well past its expected life span. Marco Philippon, Water Treatment Superintendent, explained that the pump station is in the spillway of the Penacook Lake reservoir, adjacent to a high hazard dam that added challenges to traditional upgrades. COVID and supply chain challenges delayed the project, which is now operational and near 100% completion.

Many thanks to Underwood Engineers for underwriting the cost of the coach bus this year, and to Granite State Analytical Services and Smith Pump Co. for covering the cost of morning refreshments and lunch!

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Cost / Year	$425.00	$315.00	$185.00	$160.00	$110.00	$110.00

The Journal is printed in color and mailed to NHWWA members. It is then posted on our website with a link shared with our broader email audience of 2,200 NHWWA members, drinking water operators, managers, service providers and product suppliers. The online version will have imbedded links to advertisers' websites.

* The Directory of Manufacturers Listing includes the company's name, address, phone number, website, up to three representatives, and product listing.

Deadlines: Volume I - April 1 | Volume II - September 1

NEWSLETTER ADVERTISING - three Issues per year. [Emailed to over 2,000 supporters and posted online.]

Ad size: 2.5" x 1.75". $275/year

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Deadlines: Winter - February 1 | Summer - June 1 | Fall - November 1

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